CHANGES IN THE FORM OF THE NEBULA N. G. C. 2261

By Edwin P. Hubble

YERKES OBSERVATORY, UNIVERSITY OF CHICAGO

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A comparison of photographs has established changes in structural detail in the nebula N.G.C. 2261 (h 399) R.A. 6^h 35^m, Dec. $+8°50'$. This nebula is the finest example of a cometary nebula in the northern skies. The nucleus is known as the variable star R Monocerotis, said to range from magnitudes 9 to 13.5, with an irregular period. Lassell states that the nucleus is not a star, and Professor Barnard confirms this opinion from observations with the forty-inch refractor.

Plates obtained by me with the twenty-four inch reflector during the last six months were compared in the Blink-Mikroskop with an excellent plate taken with the same telescope in March, 1908, by Mr. F. C. Jordan. In the interval, the following edge of the nebula has bulged out to a greater convexity; a bright portion of the nebulosity just north of the nucleus has shifted about 5″ toward the east; the north preceding part has moved toward the south following. In the center, however, is a sharply defined brighter wedge-shaped portion pointing to the east, which shows no motion.

In compliance with the request of the Director of this Observatory, Mme. Dorothea Roberts had the great kindness to prepare and send us both positive and negative copies of the plate of this nebula taken by the late Dr. Isaac Roberts at Starfield on January 27, 1900, and shown in *Knowledge*, vol. 24, p. 181. These amply confirm the reality of the phenomena and further establish that the motion is progressive both in direction and amount. The first impression is that the nebula is turning about its own axis after the manner of a top, and there is some indication of a helical motion toward the nucleus. The observed shifts seem to be rather of mass than of illumination and are independent of the variability of the nucleus.

Such changes are so novel that a question at once arose as to whether they might not be due to differences in exposure times or other photographic conditions rather than in the nebula itself. Fifteen plates obtained during the last six months under widely varying conditions of steadiness, transparency, and exposure time, agree perfectly in detail when compared among themselves. Of these, three were taken on the same night, with half, full, and double the normal exposure time, and show no differences other than the symmetrical building up of the image. Further, Director Frost and Professor Barnard have examined the plates

and give me authority to say that in their opinion the changes are in the nebula itself.

The position of the nebula is in a dark lane in the sky, connected with the nebulosity around 15 Monocerotis. This seems significant in that the two nebulae in which variability has certainly been established both lie in dark regions. These are N.G.C. 1555, known as Hind's variable nebula (close to T Tauri), and N.G.C. 6729 in Corona Australis. In one other case, that of the planetary N.G.C. 7662, Professor Barnard has found that the nucleus varies through several magnitudes.

Preceding the nucleus (R Monocerotis) by $4^s.4$ and north 97″ is a star somewhat fainter than the 15th magnitude with a proper motion of the order of 30″ per century. North following 9′ and 10′, respectively, are two variable stars whose maxima are at about 15.5 mag.; and north preceding 17′ is still another variable with a range of at least from the 11th to the 17th magnitude; all of which add to the interest of this remarkable region of the sky.

The plates are being measured and a more detailed investigation of the data, with reproductions of the photographs, will be published in the *Astrophysical Journal.*

ON THE EFFECT OF REMOVAL OF THE PRONEPHROS OF THE AMPHIBIAN EMBRYO

By Ruth B. Howland

SWEET BRIAR COLLEGE, SWEET BRIAR, VA.

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The following note embodies the results of a series of experiments, performed at Yale University at the suggestion of Dr. R. G. Harrison, on embryos of the spotted salamander, Amblystoma punctatum. The particular problems in mind were first, to determine whether the head kidney or pronephros is a functioning organ necessary to the life of the embryo, and second, to investigate the correlation of the development of this organ with that of other components of the excretory system.

The embryos used for the experiments were nearly of a uniform age, varying slightly in size and degree of development from the condition in which the first loop of the pronephric tubules appears as a slight, ventrally directed curve of the duct, to the stage in which the two funnels, together with the first loop, appear as a broadened Y. (Fig 1.) The tail-bud was clearly defined, and the pronephric swelling distinctly visible. In all cases, however, embryos were used before contraction of the body